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## ABSTRACT

This digest discusses teleconferencing--defined as electronic communication between two or more people at a distance--in terms of three major types: audio, video, and computer. Reasons offered for using teleconferencing include the extension of budget dollars and of educational opportunities, accommodation of a wide variety of classes, and provision of a flexible format for meetings. Audio conference options identified include dedicated conference networks; dial-up networks; "meet-me" conferencing, in which each participant calls the conferencing center from any convenient location; and audiographic teleconferencing, which involves transmission of print and graphic information over telephone lines to complement basic communication with visual information. Video teleconferencing options described include freeze-frame or slow scan television; compressed video systems; and full motion video systems, which use wideband channels to send video, voice, and data. Computer conferencing is also briefly explained. Nine additional readings are listed. (LHM)

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# ERIC DIGEST

## TELECONFERENCING IN EDUCATION

### What Is Teleconferencing?

Teleconferencing is electronic communication between two or more people at a distance. Today, teleconferencing generally involves several locations and can be divided into three major types: audio, video, and computer. These types can be combined for an almost endless set of applications.

### Why Use Teleconferencing?

College and university users have discovered that teleconferencing meets several needs:

- It extends the budget dollar to meet educational demands in an age of tight restrictions.
- It extends educational opportunities to distant locations.
- It accommodates a wide variety of classes, from college credit courses to continuing education and public service programs.
- It provides a flexible format for meetings.

### Audio Teleconferencing

Audio conferencing is actually telephone conferencing because telephone technology makes up the network that interconnects the conferees together. Although audio conferencing is not entirely suitable for such tasks as resolving conflicts and interviewing, the medium has some major strengths in its favor:

- It uses familiar technology—the telephone.
- It is widely accessible (400,000,000 telephones worldwide).
- It can set up conferences on very short notice.
- It is comparatively inexpensive.

Several audio options are available to institutions:

A dedicated conference network permanently wires preselected locations together. To conference, callers need only to pick up the phone at each location. These systems can be very large. The University of Wisconsin, for example, uses a network of more than 200 locations throughout the state to disseminate information and teach classes. Sound quality is generally better for dedicated networks than for dial-up networks. Dedicated networks become cost-effective when usage is high.

Dial-up networks use the public switched telephone network. In the telco operator-assisted mode, the operator calls and connects all participants. This system works well for a few locations, but difficulties occur when numbers increase.

To overcome these difficulties, in the past few years several private telephone conferencing companies have formed to offer a new type of service, "meet-me" conferencing, in which each participant calls the conferencing center from any convenient location. If everyone is prompt, a large number of locations can be interconnected and ready to conference in five minutes or less. The sound quality is superior to that of telco conferencing and is generally unaffected by numbers of participants. Telephones anywhere can be connected, in contrast to limited locations in dedicated networks. Meet-me systems are now available for in-house installation where usage makes them cost-effective.

The direct dial conferencing system is an innovation that makes it possible for one caller to set up a telephone conference with up to six additional participants by using a touch tone phone.

To make audio teleconferencing more comfortable, speaker phones are available to permit callers physical flexibility. These work satisfactorily for up to eight or ten participants. More sophisticated speakers are available for larger groups.

Costs vary but dial-up conferencing, via telco or meet-me, usually will cost \$20 to \$40 per location per hour.

### Audio Graphic Teleconferencing

Blending video and audio conferencing characteristics, "audiographics" refers to the transmission of print and graphic information over telephone lines to complement voice communication with visual information. Audiographics systems include a variety of devices: electronic pens, blackboards, and tablets, as well as computer systems, microfiche, telewriters, and facsimile machines.

Although not widely used as yet, a potentially useful educational device is the electronic blackboard. The blackboard converts writing to audible tones which are transmitted over telephone lines, received at one or more locations, and displayed upon a television screen. Tariffs vary but cost is about \$800 per month per location for both send and receive capabilities.

### Video Teleconferencing

Video teleconferencing combines the audio and visual media to provide interactive voice communications and television pictures. The images include anything that can be captured by a TV camera. Though full motion video (such as that transmitted on home TVs), is the most familiar technology, there are a number of options:

Freeze-frame or slow scan television uses the narrowband telephone system to transmit data, voice, and still video images. Transmission time may vary from a few seconds to more than a minute.

A compressed video system also uses a telephone data circuit. It compresses the video signal to eliminate redundant electronic information with a picture processor, or codec. The video picture appears instantly but there may be some jerkiness or blurring of fast movements.

A full motion video system uses wideband channels to send video, voice, and data. Because of the large channel capacity, it transmits a full video picture with continuous motion instantly, using cable, microwave, or the newest technology, satellites.

Obviously full motion teleconferencing has the advantage of presenting the highest quality and most natural conferencing format. The major disadvantages of full motion video are its high cost and limitations in linking multiple locations. Unlike the systems that use telephone channels, wideband video cannot readily link multiple sites for two-way video.

Costs vary for the three systems, but the range—from least to most expensive—is freeze frame to compressed video to full motion video. A single full motion video conference of several hours, linking as many as ten locations, could run between \$150,000 and \$225,000.

Although most educational institutions use economical audio teleconferencing, several pioneer videoconferencing systems (including satellite systems) are found in education.

Many video systems used in higher education are dedicated networks used on a local, regional, or statewide basis. Most use one-way video and two-way audio networks for point-to-multipoint educational programming, but audiences differ. Some programs are directed toward health professionals, others to continuing education courses, university credit courses, and administrative meetings.

Several full motion educational video systems connect as many as 30 locations. The largest freeze frame video system is operated by the University of Wisconsin Extension to connect 26 locations.

## Computer Conferencing

Computer conferencing permits two or more people to communicate with each other via computer terminals in a non-real-time mode. It is like "electronic mail" because the user can put a message into the computer and have it retrieved and responded to later.

But conferencing technology goes further. Specific software programs have been set up that permit members of a conference to interact not only with each other but also to access a wide variety of stored information germane to their objectives.

Computer conferencing adapts to course teaching, student counseling, and informed information exchange. The University of Michigan is the educational leader in this field.

## For Further Information

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